Unit 3 Higher   Data

Mean: add up the numbers and divide by how many there are	*Median:* the 'middle' number. Order the numbers from smallest to largest and it's in the middle
Mode: the most commonly occurring number	*Range:* the difference between the largest and smallest numbers.
Stem & Leaf Diagram: a pictorial representation of grouped data The stem and leaf diagram is formed by splitting the numbers into two parts - in this case, tens (stem) and units (leaves). This information is given to us in the Key. It is usual for the numbers to be ordered.	
Frequency: the number of data points that fit into a category	*Correlation:* a mutual relationship or connection between two or more things. Can be positive (both go up at the same time) or negative (both go down at the same time).
Frequency polygon: a line graph that plots the frequency against the mid point of the group	
Modal Class: the class/group that has the highest frequency	*Medians in frequency tables:* if the total frequency is *n* then the median point lies in the class containing the $\frac{n+1}{2}$
	Scatter graph: used to represent and compare two sets of data. By looking at a scatter diagram, we can see whether there is any connection (correlation) between the two sets of data.
Line of best fit: A line of best fit is a straight line drawn through the center of a group of data points plotted on a scatter plot. Scatter plots depict the results of gathering data on two variables.	*Outlier:* a point which does not fit the overall pattern of a scatter graph.
Pie chart: a type of graph in which a circle is divided into sectors that each represent a proportion of the whole	

Unit 4 Higher (Fractions, Ratio, %)

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Corbett Maths video links: **V271 V239 V234**

Fractions: Ratio, simplifying:

Reciprocal of n is $\frac{1}{n}$

To add and subtract mixed numbers, usually easier to convert them into *improper* (top-heavy) fractions, e.g.:

$$2\frac{1}{3} + 5\frac{1}{4} = \frac{7}{3} + \frac{21}{4}$$

(then use Battenburg method)

Ratios can be simplified in the same way as fractions. Divide both sides by the Highest Common Factor (HCF). **20 parts**

Clowns:Ducks = 9:6 — 9 clowns for every 6 ducks.

÷ by 3

Equivalently

Clowns:Ducks = 3:2 — 3 clowns for every 2 ducks.

A Picture

Percentages of amounts

Calculator allowed?
Turn % into decimal (÷100) and "of" means "multiply".

e.g. 30% of £54 = 30 ÷100 x 54 = £16.20

e.g. 28% of £40 = 28 ÷100 x 40 = £11.20

Reverse percentages:
Use the logic of function machines, which can be run backwards.
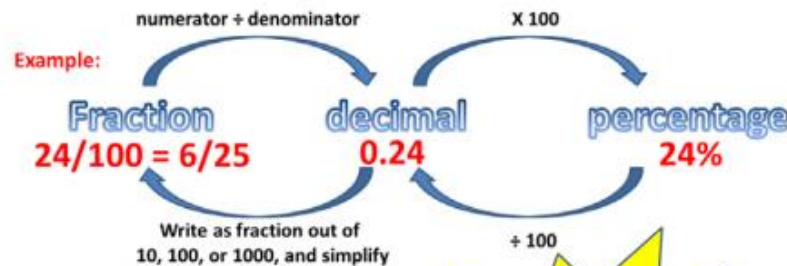You need to figure out the forwards multiplier first.

e.g. $30 dress reduced by 20%:

$30 X 0.8 $24

e.g. Sale price after 30% discount = £28

Original price £40 ÷ 0.8 £28
? X 0.7 £28

Calculator not allowed?
10% is your starting point.
10% means "a tenth of the amount" (because 10% = 10/100 = 1/10)

You can work out all the other percentages you need by scaling up or down from 10%

e.g. 30% of £54?

10% = £5.40 (a tenth of 54 = 54/10)
20% = £10.80 (20% is double 10%)
30% = £16.20 (30% = 10% + 20%)

e.g. 28% of £40?

10% = £4
1% = 40p (divide 10% by 10)
2% = 80p (double 1%)
5% = £2 (half 10%)
20% = £8 (double 10%)

28% = these 4 added together, = £11.20

Battenburg: adding

1. Draw the battenburg grid.
2. Put the fractions on the side, (left to right, top to bottom).
3. Eat the top left corner (cross it out).
4. Do the multiplications.
5. "**ADD** the peanut" (the yellow ones below).
6. Peanut answer is numerator, the remaining number is denominator.
7. Simplify the fraction, if possible.

$$\frac{1}{4} + \frac{1}{3} = \frac{7}{12}$$

	1	4
1	X	4
3	3	12

Divide top and bottom of fraction with the HCF that they share

Battenburg: subtracting

1. Draw the battenburg grid.
2. Put the fractions on the side, (left to right, top to bottom).
3. Eat the top left corner (cross it out).
4. Do the multiplications.
5. "**SUBTRACT** the peanut" (the yellow ones below).
6. Peanut answer is numerator, the remaining number is denominator.
7. Simplify the fraction, if possible.

$$\frac{1}{4} - \frac{1}{3} = \frac{1}{12}$$

	1	4
1	X	4
3	3	12

Divide top and bottom of fraction with the HCF that they share

Fractions, decimals, percentages conversion

numerator ÷ denominator   X 100

Example:

Fraction   **decimal**   **percentage**
24/100 = 6/25   0.24   24%

Write as fraction out of 10, 100, or 1000, and simplify   ÷ 100

Some examples:

1/10 = 10/100 = 0.1 = 10%
1/5 = 20/100 = 0.2 = 20%
3/10 = 30/100 = 0.3 = 30%
9/20 = 45/100 = 0.45 = 45%

People often assume a % cannot be over 100, but it can (just like a fraction can be improper* and a decimal can be over 1)

* top-heavy

Unit 5 Higher   Angles and Trigonometry

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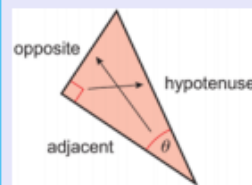
In a right-angled triangle, the longest side is called the **hypotenuse** and is opposite the right-angle.

The side opposite the angle θ is called the **opposite.**

The side that is next to angle θ is the **adjacent**.

When one side of a triangle is extended at the vertex, it forms an **exterior** angle.
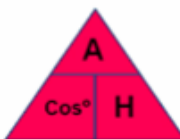
x is the **interior** angle.

y is the **exterior** angle. $x + y = 180°$
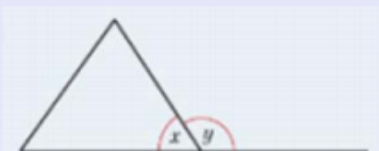
The sum of the interior angles of a polygon with n sides = (n-2) x 180°

The sum of the **exterior** angles of a polygon is always 360°

SOH   CAH   TOA

O / Sin° / H

A / Cos° / H

O / Tan° / A

Sine Ratio

$Opp = sinθ \times Hyp$

$Hyp = \dfrac{Opp}{sin\,θ}$

$sin^{-1}θ = \dfrac{Opp}{Hyp}$

Cosine Ratio

$Adj = cosθ \times Hyp$

$Hyp = \dfrac{Adj}{cosθ}$

$cos^{-1}θ = \dfrac{Adj}{Hyp}$

Tangent Ratio

$Opp = tanθ \times Adj$

$Adj = \dfrac{Opp}{tan\,θ}$

$tan^{-1}θ = \dfrac{Opp}{Adj}$

To get sin^{-1} , cos^{-1} and tan^{-1} press shift on the calculator and then the corresponding ratio.
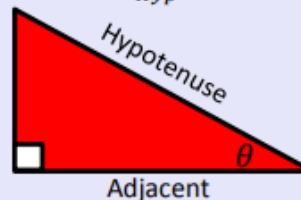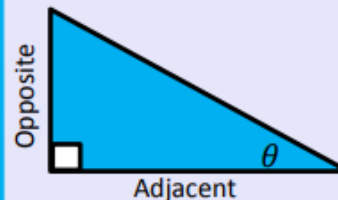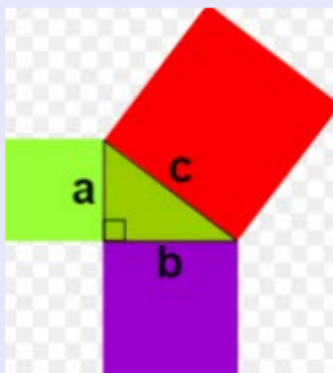
Pythagoras' Theorem

$$a^2 + b^2 = c^2$$

To find **hypotenuse**:
Square side a
Square side b
Add together
Square root

To find **shorter side**:
Square side c
Square side a or b
Subtract a or b from c
Square root

V257

$θ$	0°	30°	45°	60°	90°
$sin\,θ$	0	$\dfrac{1}{2}$	$\dfrac{1}{\sqrt{2}}$	$\dfrac{\sqrt{3}}{2}$	1
$cos\,θ$	1	$\dfrac{\sqrt{3}}{2}$	$\dfrac{1}{\sqrt{2}}$	$\dfrac{1}{2}$	0
$tan\,θ$	0	$\dfrac{1}{\sqrt{3}}$	1	$\sqrt{3}$	

The exact **sine, cosine** and **tangent** of some angles are in this table.

V329
V330
V331